

REMARKS/ARGUMENTS

Claim Amendments

By the claim amendments presented, Claims 1 and 26 would be rewritten to specifically direct these claims to a composition which is a mixture of esters.

Also by the claim amendments presented, Claim 1 would be rewritten to indicate that the methyl-*p*-toluate enriched, Witten process stream which is reacted with the diol to form the claimed composition can contain no more than 3 wt% of methyl benzoate. Support for reciting a 3 wt% maximum for methyl benzoate in the process stream which is reacted can be found in Table I in Paragraph [0030] of the published version (U.S. 2006/0223925) of the originally filed specification.

Also by the claim amendments presented, Claims 4 and 26 would be rewritten to recited specific concentration ranges for the dimethyl terephthalate, methyl-*p*-formyl benzoate, *p*-toluic acid and methyl benzoate components of the process stream which is reacted with diol to form the claimed compositions. Support for these amendments to Claim 4 and 26 can also be found in Table I in Paragraph [0030] of the published version (U.S. 2006/0223925) of the originally filed specification.

Also by the claim amendments presented, Claims 2 and 6 would be rewritten to correct an inadvertent omission of a word in Claim 2 and to correct a typo in Claim 6.

Upon entry of the claim amendments presented, Claims 1 - 7 and 26 - 28 would remain in the application. No additional claims fee would be due as a result of these claim amendments.

Invention Synopsis

The present invention as it would now be claimed is directed to toluate-based ester compositions useful as a plasticizers, extenders, or diluents in polymer formulations. Such compositions comprise mixtures of mono- and/or di-esters. These esters are prepared from the reaction of C₂-C₆ diols, such as diethylene glycol and triethylene glycol, with a certain type of methyl-*p*-toluate enriched reactant stream. This methyl-*p*-toluate-enriched stream can contain components such dimethyl terephthalate, methyl-*p*-formyl benzoate, *p*-toluic acid and methyl benzoate in addition to the primary

reactant methyl-*p*-toluate. Such a stream can conveniently be provided as part of the Witten process for the preparation of dimethyl terephthalate but must contain no more than 3 wt% of methyl benzoate. The mixed ester compositions which result from the reaction of these two types of materials are liquid compositions of low volatility and have a viscosity of less than 0.35 pascal second at 25 °C.

The toluate ester based compositions of this invention can be used as is or can be combined with extenders such as tall oils or modified tall oils or natural vegetable oils. The resulting compositions find use as low volatility extenders, diluents and solvents for polymers such as polyvinyl chloride and phenolic resins.

Formal Matters

In the Final Office Action, a new rejection of Claims 1-7 and 26-28 under 35 U.S.C. §112, Second Paragraph, has been applied. The Examiner contends that these claims are indefinite because it is unclear what in the methyl-*p*-toluate enriched streams reacts with the esterifying diols. Such a new rejection is respectfully traversed as it would apply to the claims as they would be amended herein.

The methyl-*p*-toluate enriched stream used to prepare the compositions of the amended claims herein is in some claims characterized as being derived from the Witten process for making dimethyl terephthalate (DMT). In other claims, the components of the methyl-*p*-toluate enriched stream are actually named. It is submitted these several types of components comprising such a process stream, i.e., methyl-*p*-toluate, DMT, methyl-*p*-formyl benzoate, *p*-toluic acid, and methyl benzoate, are all susceptible to being mono- and/or di- esterified and/or transesterified with diols such as the recited glycols. It is further submitted that the artisan skilled in organic chemistry would know this and also would appreciate that the resulting compositions would comprise mixtures of different types of esters.

Applicant has discovered that the specified product-by-process type of ester mixtures as claimed herein are low viscosity, low volatility materials which make them especially useful as extenders, solvents, plasticizers and/or diluents for polymer

compositions. Advantageously these ester mixtures do not have to be further purified in order to have the desired viscosity and volatility characteristics. It is submitted that, in light of the foregoing considerations, the skilled artisan would be able to identify and determine the metes and bounds of the types of compositions being claimed. Such amended product-by-process type composition claims would therefore be in complete compliance with the requirements of 35 U.S.C. §112, Second Paragraph.

Art Rejections

Rejection of Claims 1-5 and 26-27

In the Final Office Action, Claims 1-5 and 26-27 have, for the first time, been rejected under 35 U.S.C. §103(a) as allegedly being unpatentably obvious over Hulsmann et al (U.S. Patent No. 4,112,240, hereinafter "Hulsmann"). The Examiner contends that the Hulsmann disclosure of the product of the reaction of a methyl benzoate stream with dipropylene glycol is suggestive of the methyl-*p*-toluate stream/glycol reaction products of the rejected claims. Such a rejection is respectfully traversed as it would apply to Claims 1-5 and 26-27 as amended herein.

Hulsmann discloses the preparation of an ester mixture formed by the catalytic transesterification of a process stream rich in methyl benzoate by reacting such a stream with dipropylene glycol. The resulting transesterification product is said to have good color and be useful as a PVC plasticizer. The methyl benzoate stream which is used to provide the Hulsmann transesterified product is said to be a by-product stream of the process for making dimethyl terephthalate. This methyl benzoate stream used in the Hulsmann invention is one which has been prepared to contain at least 80% by weight of methyl benzoate.

It is respectfully submitted that the Hulsmann reference discloses esterification of a significantly different type of process stream than the one used to make the mixed ester product of the present invention. Even though both streams may be derived from the commercial production of DMT, it is apparent that the Hulsmann stream which is transesterified with dipropylene glycol must contain at least 80 wt% of methyl benzoate, whereas the methyl-*p*-toluate stream used to prepare applicant's compositions can

contain no more than 3 wt% of methyl benzoate. It is thus further apparent that the Hulsman esterified product and the mixed ester compositions of the presently claimed invention are completely different, and are indeed mutually exclusive, with respect to the type of process streams used in their respective preparation. Accordingly, the nature of the ester make-up of the Hulsman compositions and the compositions of the present invention are also so completely different that one cannot properly be said to suggest the other. Hulsman, in fact, teaches directly away from the preparation of the type of low methyl benzoate mixed ester compositions claimed by applicant.

Given the foregoing considerations, it is clear that the Hulsman patent does not obviously suggest applicant's presently presented Claims 1-5 and 26-27. Therefore, continued rejection of these claims as amended herein under 35 U.S.C. §103 over Hulsman would be improper.

Rejection of Claims 6, 7 and 28

Claims 6-7 have been finally rejected under 35 U.S.C. §103(a) as allegedly being unpatentably obvious over Hulsman in view of GB 947764 (cited as CAS Online Citation 60:69197, hereinafter "GB '764"). The Examiner contends that it would have been obvious to add "tall oil fatty acids" to (presumably) the Hulsman (not Arendt) compositions in light of the GB '764 disclosure of soybean fatty acid derivatives in glycol benzoate plasticizers, to thereby realize applicant's claimed compositions. Such a final rejection is also respectfully traversed as it would apply to Claims 6, 7 and 28 as amended herein.

GB '764 discloses a plasticized poly(vinyl chloride) composition which comprises dipropylene glycol benzoate and epoxidized soybean fatty acids along with a number of other ingredients. GB '764 does not disclose any resins plasticized with glycol toluate esters or with any esters in combination with unepoxidized tall oil fatty acids or natural oils.

It is submitted that while GB '764 might suggest the use of some kinds of fatty acid derivatives in combination with the Hulsman transesterified methyl benzoate materials, that suggestion does not result in the applicant's claimed combination of different fatty acid derivatives with applicant's mixed esters of methyl-*p*-toluate which

are themselves different from the Hulsmann transesterified materials. In other words, the GB '764 reference simply does not rectify the deficiencies in the teaching of Hulsmann with respect to the specific components of applicant's claimed compositions. GB '764 uses neither the same kinds of glycol esters nor the same kind of fatty acids or derivatives thereof as are recited in applicant's Claims 6, 7 and 28 as amended herein. It cannot therefore be properly concluded that the skilled artisan reading both Hulsmann and GB '764 together would obviously be led to prepare the same kinds of compositions as described in the claims rejected over these two references.

Given all of the foregoing considerations, it is respectfully submitted that the reference combination of Hulsmann and GB '764 is not one which is properly said to suggest or render obvious the particular fatty acid/oil-containing toluate ester compositions of applicant's Claims 7, 6 and 28 as amended herein. Continued rejection of these amended claims under 35 U.S.C. §103(a) over Hulsmann in view of GB '764 would therefore be improper.

Conclusions

Applicant has made an earnest effort to place her application in proper form and to distinguish her claimed invention from the applied prior art. WHEREFORE, reconsideration of this application, entry of the claim amendments presented herein, withdrawal of the claim rejections under 35 U.S.C. §§103 and 112, and allowance of Claims 1-7 and 26-28 as amended herein, are all respectfully requested. Alternatively, entry of the claim amendments presented herein in order to place the claims in better form for appeal is respectfully requested.

It is also respectfully requested that the Examiner expeditiously notify applicant's undersigned attorney as to the disposition of the amendments and arguments presented herein in accordance with MPEP §714.13.

Any comments or questions concerning this application can be directed to the undersigned at the telephone number given below.

Respectfully submitted,

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By: 

George W. Allen
Registration No. 26,143
Attorney for Applicant

INVISTA North America S.à r.l.
Three Little Falls Centre/1052
2801 Centerville Road
Wilmington, DE 19808
Telephone: (302) 683-3316
Facsimile: 302-683-3473